

**EPA Superfund
Record of Decision:**

**REPUBLIC STEEL CORP. QUARRY
EPA ID: OHD980903447
OU 01
ELYRIA, OH
09/30/1988**

EXCAVATION OF APPROXIMATELY 100 CUBIC YARDS OF CONTAMINATED SOIL THAT ARE LOCATED (1) IN THE DITCH PREVIOUSLY USED TO DISCHARGE PICKLE LIQUOR TO THE QUARRY AND (2) ALONG THE SOUTHERN END OF THE QUARRY;

DISPOSING EXCAVATED SOIL ACCORDING TO RCRA REGULATIONS.

BECAUSE LOW LEVELS OF HAZARDOUS SUBSTANCES WILL REMAIN ON SITE, THE FIVE YEAR FACILITY REVIEW WILL APPLY TO THIS ACTION. SPECIFIC TASKS RECOMMENDED AS PART OF THIS MONITORING PROCESS ARE:

CONDUCTING A FISH SPECIES SURVEY AND FISH TISSUE BIOASSAY TO ASSURE THE ABSENCE OF CONTAMINANTS. THE SURVEY WILL IDENTIFY FISH SPECIES PRESENT IN THE QUARRY. FISH TISSUE SAMPLES WILL BE COLLECTED FROM EACH SPECIES.

RESAMPLING GROUNDWATER TO ASSURE THE CONCENTRATIONS OF ANY CONTAMINANTS ARE AT ACCEPTABLE RISK LEVELS.

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DECLARATION

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINS FEDERAL AND STATE REQUIREMENTS THAT ARE APPLICABLE OR RELEVANT AND APPROPRIATE, AND IS COST-EFFECTIVE. DUE TO THE LIMITED SCOPE OF THIS REMEDY, THE STATUTORY PREFERENCE FOR TREATMENT WILL NOT BE MET. THE SMALL VOLUME AND LEVELS OF CONTAMINATION PRESENT IN THE SOILS DO NOT MAKE TREATMENT A COST-EFFECTIVE ALTERNATIVE. FINALLY, I HAVE DETERMINED THAT THIS REMEDY UTILIZES PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE.

	VALDAS V. ADAMUS
DATE	REGIONAL ADMINISTRATOR
9/30/88	U.S. EPA, REGION V

SITE BACKGROUND

SITE LOCATION AND DESCRIPTION

THE REPUBLIC STEEL QUARRY SITE IS LOCATED IN THE CITY OF ELYRIA, OHIO WHICH IS SOUTHWEST OF CLEVELAND IN LORAIN COUNTY (SEE FIGURE 1). THE SITE IS LOCATED BETWEEN WEST RIVER ROAD AND THE WEST BRANCH OF THE BLACK RIVER, DIRECTLY WEST ACROSS THE RIVER FROM FRANKLIN SCHOOL (SEE FIGURE 2). THE SITE MAY BE FOUND ON THE GRAFTON USGS QUADRANGLE MAP IN TOWNSHIP 5 NORTH, RANGE 17 WEST.

THE SITE CONSISTS OF A FOUR-ACRE QUARRY CONTAINING WATER AND SEVEN ACRES OF FENCED LAND SURROUNDING THE QUARRY (SEE FIGURE 3). WATER IN THE QUARRY HAS BEEN MEASURED AT DEPTHS UP TO 62 FT. THE SIDES OF THE QUARRY ARE NEARLY VERTICAL AND RISE TO AN AVERAGE OF ABOUT 25 FT. ABOVE THE QUARRY WATER SURFACE ELEVATION. QUARRY WALLS ARE COMPOSED OF BEREA SANDSTONE AT AND BELOW PRESENT WATER LEVEL AND TO VARYING HEIGHTS ABOVE THE PRESENT WATER LEVEL. QUARRY WALLS ABOVE THE SANDSTONE ARE COMPOSED OF VERTICALLY STACKED, LARGE SANDSTONE BLOCKS.

SITE PHYSIOGRAPHY

LORAIN COUNTY, IN WHICH THE REPUBLIC STEEL QUARRY SITE IS LOCATED, IS ON THE EASTERN FRINGE OF THE TILL PLAIN AREA OF THE GREAT CENTRAL LOWLANDS. THE TOPOGRAPHY IS GENERALLY FLAT TO GENTLY ROLLING. THE SURFACE SLOPES GENTLY FROM A HIGH ELEVATION IN THE SOUTHERN PART OF THE COUNTY TO A LOW ELEVATION AT LAKE ERIE. EXCEPTIONS TO THE NEARLY FLAT TOPOGRAPHY ARE GORGES OF THE BLACK RIVER NEAR ELYRIA AND THE SITE. THESE GORGES EXPOSE THE UNDERLYING BEDROCK.

VEGETATION IMMEDIATELY ADJACENT TO THE QUARRY PERIMETER IS MOSTLY GRASS AND SMALL BRUSH; HOWEVER, LARGER TREES ARE FOUND AROUND THE SITE AND ALONG THE RIVER. VEGETATION IS FAIRLY DENSE OVER MOST OF THE SITE.

POPULATION

THE REPUBLIC STEEL QUARRY SITE IS LOCATED IN THE WEST SIDE OF THE CITY OF ELYRIA, WHICH HAS A POPULATION OF APPROXIMATELY 58,000. THE ECONOMY OF THE CITY IS SUPPORTED PRIMARILY BY MORE THAN 150 SMALL, LIGHT

INDUSTRIES. THE NEIGHBORHOOD AROUND THE SITE IS LARGELY RESIDENTIAL.

SITE HISTORY

THE REPUBLIC STEEL QUARRY SITE WAS OPERATED AS A SANDSTONE QUARRY DURING AN UNKNOWN PERIOD OF TIME PRIOR TO 1950 WHEN THE QUARRY BEGAN TO BE USED FOR PICKLE LIQUOR DISPOSAL. PICKLE LIQUOR IS AN ACID USED TO DISSOLVE OXIDES PRESENT IN MILL SCALE THAT FORMS ON STEEL DURING THE HOT ROLLING PROCESS. REPUBLIC STEEL REPORTEDLY DISCHARGED APPROXIMATELY 200,000 GALLONS OF PICKLE LIQUOR INTO THE QUARRY EACH YEAR FROM 1950 TO 1972. WASTE PICKLE LIQUOR HAS REPORTEDLY PUMPED THROUGH AN ABOVE-GROUND PIPE TO A DITCH, LOCATED ON THE EAST SIDE OF THE PLANT, WHICH FLOWED NORTH INTO THE QUARRY. FROM 1972 TO 1975, THE DITCH WAS STILL USED TO DIRECT RINSE WATER FROM STEEL PICKLING OPERATIONS INTO THE QUARRY. IN 1976, THE PICKLE LIQUOR DISCHARGE DITCH WAS DAMMED ABOUT 100 FEET SOUTH OF THE SITE FENCE. LTV'S RECORDS INDICATE THAT SULFURIC ACID WAS USED TO PICKLE THE STEEL AND WAS DISPOSED IN THE QUARRY.

IN 1981, REPUBLIC STEEL CORPORATION NOTIFIED EPA OF ITS PAST DISPOSAL ACTIVITIES TO COMPLY WITH SECTION 103(C) OF CERCLA. IN RESPONSE TO REPUBLIC STEEL'S NOTIFICATION, THE U.S.EPA FIELD INVESTIGATION TEAM (FIT) CONTRACTOR PERFORMED A SITE INVESTIGATION FOR EPA IN LATE 1983 AND INSTALLED THREE MONITORING WELLS. NO ORGANIC CONTAMINATION WAS DETECTED AT THE SITE; HOWEVER, HEAVY METALS SUCH AS CHROMIUM, ARSENIC, LEAD, CADMIUM, MAGNESIUM, ALUMINUM, AND IRON WERE DETECTED IN THE GROUNDWATER AT HIGHER LEVELS IN THE DOWN-GRADIENT MONITORING WELL THAN IN THE UP-GRADIENT WELLS. THE SITE WAS EVALUATED USING THE HAZARD RANKING SYSTEM (HRS) AND PROPOSED TO BE INCLUDED IN UPDATE II OF THE NATIONAL PRIORITIES LIST (NPL). THE SITE WAS LISTED ON THE NPL ON OCTOBER 16, 1984.

AT THE REQUEST OF LTV STEEL, IT CORPORATION (IT) CONDUCTED AN INVESTIGATION OF THE SITE IN NOVEMBER 1984 THAT INCLUDED SAMPLING AND CHEMICAL ANALYSIS OF QUARRY WATER SAMPLES AND EPA-INSTALLED MONITORING WELLS. THIS INVESTIGATION CONCLUDED THAT EPA'S SCORE SHOULD BE RECOMPUTED BASED ON EVIDENCE OBTAINED IN THEIR INVESTIGATION. ACCORDING TO IT, THE RE-COMPUTED SCORE WOULD NOT BE HIGH ENOUGH FOR THE SITE TO BE INCLUDED ON THE NPL. ON DECEMBER 13, 1984, LTV STEEL SUBMITTED A LETTER TO EPA STATING THEIR OBJECTION TO THE QUARRY'S INCLUSION ON THE NPL. INCLUDED WITH THE LETTER WAS A COPY OF IT'S REPORT AS SUPPORTING EVIDENCE. THE LETTER STATED THAT THE-RESULTS OF IT'S STUDY CONCLUDED THAT THE QUARRY HAD VIRTUALLY RETURNED TO ITS ORIGINAL NATURAL CONDITION.

EPA REVIEWED THE IT DATA AND CONCLUDED THAT ORIGINAL HRS SCORE FOR THE REPUBLIC STEEL QUARRY WAS CORRECTLY CALCULATED, AND THAT THE SITE SHOULD REMAIN ON THE NPL UPDATE II LIST. ON JANUARY 8, 1986, EPA SUBMITTED A LETTER TO THE STATE OF OHIO CLEARING HOUSE FOR REVIEW UNDER THE STATE INTERGOVERNMENTAL REVIEW PROCESS. IN THIS LETTER, U.S. EPA PROPOSED A RI/FS FOR THE REPUBLIC STEEL QUARRY.

ON MAY 9, 1986, OHIO EPA REVIEWED THE STATEMENT OF WORK FOR THE RI/FS AND INDICATED THEIR WILLINGNESS TO SUPPORT AND ASSIST THE PROGRAM IN A LETTER TO U.S. EPA, REGION V.

ENFORCEMENT ACTIVITIES

BEFORE COMMENCING REMEDIAL INVESTIGATION ACTIVITIES, IN APRIL OF 1986, U.S. EPA OFFERED THE OPPORTUNITY TO CONDUCT THE WORK TO THE TWO POTENTIALLY RESPONSIBLE PARTIES; LTV STEEL, FORMER OWNER OF THE SITE AND THE CITY OF ELYRIA, PRESENT OWNER OF THE SITE. BECAUSE THE PARTIES DISAGREED OVER THE NECESSITY FOR LISTING THE SITE ON THE NPL, LTV AND THE CITY OF ELYRIA WOULD NOT AGREE TO CONDUCT THE REMEDIAL INVESTIGATION UNDER THE AGENCIES' OVERSIGHT. U.S. EPA, THEREFORE, CONDUCTED THE RI IN COOPERATION WITH OHIO EPA.

COPIES OF THE PROPOSED PLAN FOR THE REPUBLIC STEEL QUARRY SITE WERE SENT TO THE PUBLIC INFORMATION REPOSITORY ON SEPTEMBER 1, 1988 AND THE PRPS WERE INFORMED THAT U.S. EPA INTENDED TO CONDUCT A REMEDIAL ACTION AT THE SITE. SPECIAL NOTICE LETTERS WILL BE SENT, WHICH WILL ESTABLISH A SIXTY (60) DAY MORATORIUM TO PROVIDE OPPORTUNITY FOR THE PRPS TO SUBMIT A GOOD FAITH PROPOSAL TO CARRY OUT THE REMEDIAL ACTION (RA).

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COMMUNITY RELATIONS HISTORY

COMMUNITY RELATIONS ACTIVITIES AT THE REPUBLIC STEEL QUARRY SITE HAVE BEEN HANDLED WITH DIRECT INVOLVEMENT BY

THE U.S. EPA AND OHIO EPA. THE INITIAL CONTACT WITH THE PUBLIC WAS IN THE FORM OF INTERVIEWS WITH REPRESENTATIVES OF THE CITY OF ELYRIA AND THE BLACK RIVER CHAPTER OF THE IZAAK WALTON LEAGUE.

TWO PUBLIC MEETINGS HAVE BEEN HELD FOR THE SITE. THE FIRST AVAILABILITY SESSION WAS HELD ON FEBRUARY 4, 1987 PRIOR TO INITIATING FIELD ACTIVITIES. THE SECOND MEETING WAS HELD ON SEPTEMBER 15, 1988 TO PRESENT FINDINGS, ANSWER QUESTIONS, AND RECEIVE COMMENTS ON THE REMEDIAL INVESTIGATION REPORT AND THE PROPOSED PLAN.

THE CITY OF ELYRIA HAS SHOWN A HIGH LEVEL OF INTEREST IN THE SITE BECAUSE THE CITY IS A PRP. MAJOR CONCERNS OF THE CITY INCLUDE:

- ! CITY OFFICIALS HAVE CONCLUDED FROM PRIVATE STUDIES THAT THE SITE HAS RETURNED TO NATURAL CONDITIONS AND THAT IT SHOULD NOT HAVE BEEN LISTED ON THE NPL.
- ! CITY OFFICIALS DO NOT BELIEVE THEY SHOULD BE HELD LIABLE TO PAY FOR REMEDIAL ACTIONS CONDUCTED BY U.S. EPA BECAUSE THEY PURCHASED THE PROPERTY IN GOOD FAITH FROM LTV CORPORATION.

CONCERNS OF THE IZAAK WALTON LEAGUE INCLUDE:

- ! THE NATURE OF CONTAMINATION IN THE QUARRY PIT.
- ! THE ENVIRONMENTAL IMPACT OF CONTAMINANTS FROM THE SITE UPON THE BLACK RIVER.
- ! POTENTIAL HEALTH IMPACTS ON THE COMMUNITY.
- ! THE FUTURE USE OF THE SITE AREA. IWL MEMBERS WOULD LIKE TO SEE

THE SITE CLEANED UP SO THAT IT IS AVAILABLE FOR PUBLIC USE.

RESIDENTS LIVING NEAR THE SITE DID NOT CONSIDER THE POSSIBLE CONTAMINATION TO BE A PRESSING ISSUE, ACCORDING TO THE CITY COUNCILMAN REPRESENTING THE 5TH WARD.

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SITE CHARACTERIZATION

REMEDIAL INVESTIGATION FIELD WORK WAS INITIATED JUNE, 1987 AND WAS COMPLETED DURING MARCH, 1988. THIS SECTION SUMMARIZES THE RESULTS OF THE VARIOUS WORK TASKS COMPLETED. SAMPLES OF SURFACE WATER, SEDIMENTS, SURFACE SOILS AND GROUND WATER WERE COLLECTED AND ANALYZED TO ESTIMATE THE TYPES AND EXTENT OF CONTAMINATION DUE TO THE SITE.

SURFACE WATER

SURFACE WATER SAMPLES WERE COLLECTED FROM THE QUARRY AND BLACK RIVER ADJACENT TO THE SITE ON TWO OCCASIONS IN JUNE 1987 AND MARCH 1988. DURING THE JUNE 1987 SAMPLING, 19 QUARRY AND 6 RIVER SAMPLES WERE OBTAINED AND ANALYZED FOR A COMPLETE RANGE OF ORGANIC AND INORGANIC CHEMICALS. A SECOND SAMPLING, PERFORMED DURING MARCH 1988, COLLECTED WATER FROM APPROXIMATELY THE SAME LOCATIONS ORIGINALLY SAMPLED BUT THE SAMPLES WERE ANALYZED ONLY FOR SEMI-VOLATILE ORGANIC CHEMICALS.

QUARRY SURFACE WATER SAMPLE ANALYSES WERE COMPARED TO UPGRADIENT GROUND WATER SAMPLE ANALYSES TO DETERMINE SITE RELATED CONTAMINATION. THE UPGRADIENT GROUND WATER DATA WAS CHOSEN AS THE BEST BACKGROUND INFORMATION AVAILABLE BECAUSE THE QUARRY SURFACE WATERS ARE SITUATED BELOW THE WATER TABLE IN THE SAME WATER BEARING UNIT. NO ORGANIC CHEMICALS WERE IDENTIFIED IN THE QUARRY WATERS AS BEING POTENTIALLY SITE RELATED. SEVERAL INORGANIC CHEMICALS WERE IDENTIFIED AS BEING POTENTIALLY SITE RELATED. THESE CHEMICALS INCLUDE BARIUM, CALCIUM, IRON, MAGNESIUM, MANGANESE, NICKEL, VANADIUM AND ZINC. TABLE 1 LISTS CONCENTRATIONS OF SITE RELATED CHEMICALS OF CONCERN.

THE DOWNSTREAM BLACK RIVER SAMPLES WERE COMPARED TO UPSTREAM RIVER SAMPLES AND QUARRY SAMPLES TO ESTIMATE IF THE SITE WAS AFFECTING RIVER WATER QUALITY.

THE RESULTS OF THIS COMPARISON INDICATED THAT THE SITE WAS NOT ADVERSELY IMPACTING THE OVERALL QUALITY OF THE BLACK RIVER WATER. ONE ANALYSIS FOR ZINC, IN THE MIXING ZONE BELOW THE QUARRY OUTLET, SHOWED AN ELEVATED CONCENTRATION. THIS IS DISCUSSED MORE THOROUGHLY IN THE ENDANGERMENT ASSESSMENT SECTION.

SEDIMENTS

SEDIMENT SAMPLES FROM THE QUARRY AND THE BLACK RIVER WERE COLLECTED IN JUNE 1987 AND ANALYZED FOR ORGANIC AND INORGANIC CHEMICALS. EIGHT SAMPLES OF QUARRY SEDIMENTS AND FOUR SAMPLES OF BLACK RIVER SEDIMENTS WERE COLLECTED. THE NATURE AND EXTENT OF CONTAMINATION EVALUATION FOR SEDIMENTS WAS PERFORMED IN TWO PHASES TO DETERMINE IF THE QUARRY SEDIMENTS WERE CONTAMINATED AND TO ESTIMATE IF THE QUARRY HAD ADVERSELY IMPACTED THE QUALITY OF BLACK RIVER SEDIMENTS.

FROM THESE ANALYSES THE AGENCY CONCLUDED THAT SEDIMENTS WITHIN THE QUARRY ARE CONTAMINATED WITH VOLATILE AND SEMI-VOLATILE ORGANIC AND INORGANIC CHEMICALS. TABLE 2 PRESENTS CONCENTRATIONS OF CHEMICALS OF CONCERN IDENTIFIED IN THE SEDIMENT SAMPLES. VOLATILE ORGANIC COMPOUNDS WERE DETECTED ONLY IN THE DEEP QUARRY SEDIMENT SAMPLES (GREATER THAN 35 FT.) WHILE SEMI-VOLATILE ORGANICS AND INORGANICS WERE DETECTED IN BOTH DEEP AND SHALLOW SAMPLES. THE CONCENTRATIONS OF THE INORGANIC AND SEMI-VOLATILE CONTAMINANTS OF THE SEDIMENTS OBTAINED FROM DEEPER PORTION OF THE QUARRY WERE GREATER THAN THE SHALLOW SEDIMENT CONCENTRATIONS BUT POSE NO IMMINENT THREAT, HOWEVER, BECAUSE THE SEDIMENTS ARE NOT BELIEVED TO MIX INTO THE QUARRY WATERS. MIXING PROBABLY DOES NOT OCCUR BECAUSE MEASUREMENTS OF WATER CHARACTERISTICS IN THE QUARRY SHOWED THAT WATER DOES NOT CIRCULATE WITH ENOUGH FORCE TO STIR UP THE SEDIMENTS. THE QUARRY IS ALSO PROTECTED BY TREES, WHICH REDUCE WIND ACTION ON THE QUARRY WATER. CONCENTRATIONS OF CONTAMINANTS IN THE SHALLOW SEDIMENTS WERE DETERMINED TO POSE NO IMMINENT HEALTH RISK.

FURTHER, COMPARISON OF DOWNSTREAM BLACK RIVER SEDIMENTS TO UPSTREAM RIVER AND QUARRY SEDIMENTS HAS PERFORMED TO ESTIMATE IF THE SITE IS ADVERSELY IMPACTING BLACK RIVER SEDIMENTS. THE ANALYSES INDICATED THAT NO POTENTIALLY SITE RELATED ORGANIC OR INORGANIC CHEMICALS WERE DETECTED IN THE SEDIMENTS DOWNSTREAM. THE SITE IS NOT AFFECTING SEDIMENTS IN THE BLACK RIVER.

SURFACE SOILS

EIGHT SURFACE SOIL SAMPLES WERE COLLECTED IN JUNE 1987. TWO SAMPLES WERE COLLECTED FROM BACKGROUND LOCATIONS WHILE SIX SAMPLES WERE COLLECTED IN AN EFFORT TO IDENTIFY POTENTIAL SITE CONTAMINATION. ANALYSES PERFORMED ON SURFACE SOILS OBTAINED FROM AREAS OF THE SITE THAT WERE PERIODICALLY INUNDATED BY QUARRY WATER OR THAT WERE EXPOSED TO WASTE DISCHARGES IN THE PAST DETECTED CONTAMINANTS ABOVE BACKGROUND CONCENTRATIONS. CONTAMINANTS DETECTED INCLUDED VOLATILE AND SEMI-VOLATILE ORGANIC AND INORGANIC CHEMICALS AT LOW CONCENTRATIONS. CONCENTRATIONS OF CHEMICALS OF CONCERN IN THESE SOILS ARE SHOWN IN TABLE 3. SEMI-VOLATILE AND INORGANIC CHEMICALS WERE ALSO DETECTED IN A SAMPLE OF THE STEEL YARD SOILS THAT ARE SLIDING INTO THE QUARRY.

GROUNDWATER

EIGHT MONITORING WELLS WERE INSTALLED AT OR NEAR THE REPUBLIC STEEL QUARRY SITE. ALL OF THESE WELLS WERE SAMPLED IN AUGUST 1987 AND TWO

WELLS WERE RESAMPLED AND ANALYZED FOR ORGANICS IN MARCH 1988.

VOLATILE AND SEMI-VOLATILE ORGANIC AND INORGANIC CONTAMINANTS WERE DETECTED IN GROUNDWATER SAMPLES DOWN-GRADIENT FROM THE QUARRY. TABLE 4 GIVES CONCENTRATIONS OF CHEMICALS OF CONCERN IDENTIFIED IN THE GROUND WATER. VOLATILE AND SEMI-VOLATILE ORGANICS WERE DETECTED ONLY AT LOW CONCENTRATIONS IN MONITORING WELLS ADJACENT TO THE SITE. THESE CONTAMINANTS WERE NOT DETECTED IN THE MONITORING WELL ACROSS THE BLACK RIVER EAST OF THE SITE. INORGANIC CHEMICALS WERE DETECTED IN ALL DOWN-GRADIENT WELLS ADJACENT TO THE SITE AND IN THE WELL ACROSS THE BLACK RIVER (MONITORING WELL B-8). A DIRECT CONNECTION TO SITE RELATED CONTAMINATION CANNOT BE MADE TO THE INORGANICS DETECTED IN MONITORING WELL B-8.

ENDANGERMENT ASSESSMENT

THE POTENTIAL RISKS TO HUMAN HEALTH ATTRIBUTED TO CHEMICALS PRESENT AT THE REPUBLIC STEEL QUARRY SITE WERE EVALUATED UNDER A NUMBER OF EXPOSURE SCENARIOS. POTENTIAL PATHWAYS OF EXPOSURE TO CHEMICALS ORIGINATING AT THE SITE UNDER BOTH CURRENT-USE AND HYPOTHETICAL FUTURE-USE CONDITIONS WERE EXAMINED. TABLES 5 AND 6 SUMMARIZE POTENTIAL PATHWAYS OF EXPOSURE UNDER CURRENT-USE AND FUTURE-USE CONDITIONS, RESPECTIVELY. COMPLETE PATHWAYS WERE THEN EVALUATED IN REGARD TO CARCINOGENIC AND NON-CARCINOGENIC RISKS POSED TO PUBLIC HEALTH.

FOR POTENTIAL CARCINOGENS, EXCESS LIFETIME CANCER RISKS ARE OBTAINED BY MULTIPLYING THE DAILY INTAKE OF THE CONTAMINANT UNDER CONSIDERATION BY ITS CANCER POTENCY FACTOR. A RISK LEVEL OF $10(-6)$ REPRESENTS AN UPPER BOUND PROBABILITY THAT ONE EXCESS CANCER CASE IN 1,000,000 INDIVIDUALS MIGHT RESULT FROM EXPOSURE TO THE POTENTIAL CARCINOGEN, AND IS USED AS A BENCHMARK BY REGULATORY AGENCIES. POTENTIAL RISKS FOR NON-CARCINOGENS ARE PRESENTED AS THE RATIO OF THE CHRONIC DAILY INTAKE EXPOSURE TO THE REFERENCE DOSE (CDI:RFD). THE SUM OF ALL OF THE RATIOS OF CHEMICALS UNDER CONSIDERATION IS CALLED THE HAZARD INDEX. THE HAZARD INDEX IS USEFUL AS A REFERENCE POINT FOR GAUGING THE POTENTIAL EFFECTS OF ENVIRONMENTAL EXPOSURE TO COMPLEX MIXTURES. IN GENERAL, HAZARD INDICES WHICH ARE LESS THAN ONE ARE NOT LIKELY TO BE ASSOCIATED WITH ANY HEALTH RISKS, AND ARE THEREFORE LESS LIKELY TO BE OF REGULATORY CONCERN THAN HAZARD INDICES GREATER THAN ONE.

TABLE 7 SUMMARIZES POTENTIAL RISKS ASSOCIATED WITH THE SITE. UNDER CURRENT USE CONDITIONS, THE ONLY EXPOSURE SCENARIO RESULTING IN A GREATER THAN $10(-6)$ RISK IS THE MAXIMUM CASE FOR INGESTION OF FISH. HOWEVER, THIS RISK IS PRIMARILY DUE TO THE POSSIBLE UPTAKE BY THE FISH OF CARCINOGENIC PNAS FOUND IN THE QUARRY SEDIMENT. THIS WAS CONSERVATIVELY ESTIMATED USING A SEDIMENT TO FISH TISSUE MODEL. TABLE 8 LISTS AVAILABLE ARARS USED IN THE ENDANGERMENT ASSESSMENT. FISH METABOLIZE PNA TO SOME EXTENT, FURTHER REDUCING THE DOSE CONCENTRATION. ADDITIONALLY, THIS MAXIMUM EXPOSURE SCENARIO RESULTS IN A HAZARD INDEX GREATER THAN THE ONE BECAUSE THE ESTIMATED CHRONIC DAILY INTAKE FOR MERCURY IS GREATER THAN AVAILABLE CRITERIA FOR PROTECTION AGAINST NONCARCINOGENIC EFFECTS. HOWEVER, MERCURY WAS ONLY DETECTED IN 2 OUT OF 7 SEDIMENT SAMPLES AND THIS RISK IS BASED ON MODELING THE CONCENTRATION OF MERCURY FROM THE SEDIMENT TO FISH TISSUE USING VERY CONSERVATIVE ASSUMPTIONS. COMBINED RISKS TO TRESPASSERS, ASSUMING THE SAME PERSON WOULD BE EXPOSED TO SOIL THROUGH DIRECT CONTACT AND INCIDENTAL INGESTION, QUARRY WATER THROUGH SWIMMING, AND FISH THROUGH INGESTION WERE ESTIMATED.

AS INDICATED IN TABLE 7, THE COMBINED UPPER-BOUND EXCESS LIFETIME CANCER RISKS ARE $3 \times 10(-8)$ TO $4 \times 10(-6)$ UNDER AVERAGE AND MAXIMUM EXPOSURE CONDITIONS RESPECTIVELY. THE COMBINED CURRENT-USE HAZARD INDEX IS LESS THAN ONE UNDER THE AVERAGE EXPOSURE SCENARIOS AND GREATER THAN ONE UNDER THE MAXIMUM EXPOSURE SCENARIOS.

EVALUATION OF THE EXPOSURE SCENARIOS UNDER FUTURE-USE CONDITIONS RESULTED IN AN UPPER-BOUND EXCESS CANCER RISK GREATER THAN $10(-6)$. MAXIMUM EXPOSURE TO FUTURE RESIDENTS WOULD OCCUR THROUGH DIRECT CONTACT AND INCIDENTAL INGESTION OF SOIL, AND INGESTION OF GROUNDWATER. CONSEQUENTLY, THE COMBINED POTENTIAL RESIDENTIAL RISK EXCEEDS $10(-6)$ (SEE TABLE 7). IT SHOULD BE NOTED THAT THE RISK DERIVED FROM THE INGESTION OF GROUND WATER IS BEING DRIVEN BY A ONE TIME DETECTION OF METHYLENE CHLORIDE IN ONE DOWNGRADE MONITORING WELL. RESAMPLING THE WELL DID NOT DETECT METHYLENE CHLORIDE, WHICH IS A COMMON LABORATORY CONTAMINANT. THEREFORE, THE PRESENCE OF METHYLENE CHLORIDE IS QUESTIONABLE. THE NEED FOR CONFIRMATORY SAMPLING IS INDICATED. CONTAMINATED SOILS WERE LIMITED TO A SMALL AREA IN THE PICKLE LIQUOR DISCHARGE DITCH AND THE ADJACENT RAMP-LIKE FEATURE WHICH IS PERIODICALLY INUNDATED WITH QUARRY WATER.

IN EVALUATING THE COMBINED NONCARCINOGENIC FUTURE RISK, THE HAZARD INDEX IS GREATER THAN ONE UNDER THE MAXIMUM EXPOSURE SCENARIOS. HOWEVER, NONE OF THE NONCARCINOGENIC CHEMICALS IN GROUNDWATER HAVE CHRONIC DAILY INTAKES THAT EXCEED AVAILABLE CRITERIA. IN ADDITION, EACH OF THE CHEMICALS OF POTENTIAL CONCERN WITH THE HIGHEST CDI:RFD RATIOS HAVE DIFFERENT END POINTS OF TOXICITY. THEREFORE, IMPACTS FROM INGESTION OF NONCARCINOGENIC CHEMICALS ARE NOT EXPECTED.

WITH RESPECT TO POTENTIAL IMPACTS ON AQUATIC LIFE IN THE QUARRY, OF THE 12 CHEMICALS WITH ACUTE AMBIENT WATER QUALITY CRITERIA (AWQC) VALUES, ONLY COPPER EXCEEDS THE ACUTE CRITERIA (SEE TABLE 9). TRICHLOROETHENE, NICKEL, TOLUENE, NCPNA, MERCURY, PENTACHLOROPHENOL, AND THE PHTHALATES ARE ALL BELOW THE ACUTE LEVEL. ONE BLACK RIVER SURFACE WATER SAMPLE COLLECTED IN THE MIXING ZONE BENEATH THE QUARRY OUTLET INDICATED LEVELS OF ZINC WHICH EXCEEDED THE AWQC ACUTE CRITERIA. THERE MAY BE SOME ACUTE EFFECTS IN THE SMALL MIXING ZONE BENEATH THE QUARRY OUTLET. HOWEVER, DOWNSTREAM ZINC CONCENTRATIONS WERE VIRTUALLY IDENTICAL TO UPSTREAM ZINC CONCENTRATIONS, THEREFORE IT IS FELT THE QUARRY IS NOT AFFECTING THE OVERALL QUALITY OF THE BLACK RIVER.

TEN OF THE CHEMICALS HAVE CHRONIC AWQC VALUES (TABLE 9). OF THESE, QUARRY SURFACE WATER CONCENTRATIONS ARE

BELOW CHRONIC AWQC FOR NONCARCINOGENIC PNAS, TRICHLOROETHENE, BUTYBENZYLPHthalate, DI-N-BUTYLPHthalate, DI-N-OCTYLPHthalate, AND PENTACHLOROPHENOL. COPPER, MERCURY AND DIETHYLPHthalate WERE CHEMICALS THAT EXCEEDED THE AWQC.

IT SHOULD BE NOTED THAT RISKS POSED BY THESE CHEMICALS EXCEPT BARIUM, VANADIUM, MANGANESE AND NICKEL WERE CALCULATED USING THE SEDIMENT/WATER PARTITIONING MODEL. THE MODEL IS CONSERVATIVE AND CHEMICAL CONCENTRATIONS IN THE WATER ARE NOT EXPECTED TO BE AS LARGE AS THOSE PREDICATEDLY THE MODEL.

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EVALUATION AND DISCUSSION

THE REMEDIAL INVESTIGATION (RI) OF THE REPUBLIC STEEL QUARRY SITE IS COMPLETE AND SHOWS THAT CURRENT SITE CONDITIONS POSE A LIMITED RISK TO PUBLIC HEALTH. UNDER SECTION 300.68(E)(3) OF THE NATIONAL CONTINGENCY PLAN, THE U.S. EPA HAS THE AUTHORITY TO MODIFY AN INVESTIGATION IF, AFTER ASSESSING A NUMBER OF FACTORS RELATED TO THE DEGREE OF ENVIRONMENTAL IMPACT, THE AGENCY CONCLUDES THAT MODIFICATIONS ARE APPROPRIATE. IN THIS CASE, THE RI HAS DOCUMENTED THAT THE GREATEST RISK DUE TO CURRENT USE IS TO TRESPASSERS WHO CONSUME FISH CAUGHT IN THE QUARRY. SLIGHT FUTURE-USE RISKS COULD BE PRESENT TO PEOPLE WHO LIVE ON THE SITE AND DRINK THE GROUNDWATER AND COME IN CONTACT WITH THE SURFACE SOILS. AT PRESENT THE SITE IS FENCED AND NO EXPOSURE ROUTES FOR OFF-SITE CONTAMINATION EXIST. AFTER CAREFUL CONSIDERATION OF THE FINDINGS OF THE RI REPORT AND THE LIMITED HEALTH RISKS POSED BY THE SITE, THE AGENCY HAS CONDUCTED THE FOLLOWING ASSESSMENT OF ALTERNATIVES, TECHNOLOGIES, AND REMEDIES. THE CURRENT-USE PATHWAY EVALUATED WAS INDIRECT EXPOSURE TO QUARRY SEDIMENTS THROUGH INGESTION OF FISH WHICH COULD BE CAUGHT BY TRESPASSERS. FUTURE-USE PATHWAYS CONSIDERED INCLUDED INGESTION AND DERMAL ADSORPTION OF CONTAMINATED SOILS AND INGESTION OF GROUNDWATER BY FUTURE RESIDENTS ON THE SITE.

THE SOLE INDIRECT ROUTE FOR EXPOSURE TO CONTAMINATED QUARRY BOTTOM SEDIMENTS UNDER CURRENT-USE SCENARIOS IS VIA INGESTION OF FISH. THE RISK TO PUBLIC HEALTH ASSOCIATED WITH THE FISH WAS CONSERVATIVELY ESTIMATED USING A SEDIMENT/SURFACE WATER EXPOSURE MODEL. VIABLE RESPONSE ACTIONS CONSIDERED INCLUDED:

1. NO ACTION:
2. ACCESS RESTRICTIONS

THE BOUNDARIES OF THE SITE ARE CURRENTLY FENCED AND NO TRESPASSING SIGNS ARE POSTED. THE CITY OF ELYRIA IS CURRENTLY MAINTAINING THE FENCE.

CONTAMINATED SOIL WAS IDENTIFIED BY SAMPLING IN THE FORMER PICKLE LIQUOR DISCHARGE DITCH AND THE RAMP-LIKE FEATURE ADJACENT TO THE WEST OF THE DITCH (SEE FIGURE 3). FIELD OBSERVATIONS ESTIMATED SOIL DEPTH TO AVERAGE 0.5 FOOT THROUGHOUT THIS AREA. APPROXIMATELY 100 CUBIC YARDS OF CONTAMINATED SOIL ARE ESTIMATED TO BE PRESENT. FOUR RESPONSE ACTIONS WERE CONSIDERED TO ADDRESS THE ON-SITE SURFACE SOIL CONTAMINATION:

1. NO ACTION
2. ACCESS RESTRICTIONS
3. CONTAINMENT
4. REMOVAL WITH EITHER OFF-SITE DISPOSAL OR OFF-SITE TREATMENT (INCINERATION).

THE FIRST TWO ALTERNATIVES DID NOT MEET THE CERCLA SECTION 121(B) CLEANUP GOAL OF A PERMANENT SOLUTION AND WERE DROPPED FROM FURTHER CONSIDERATION. COST ESTIMATES WERE OBTAINED ON REMAINING ALTERNATIVES INCLUDING CAPPING OF THE SOILS AND REMOVAL OF THE ONE HUNDRED (100) CUBIC YARDS OF CONTAMINATED SOILS AND EITHER OFF-SITE DISPOSAL OR INCINERATION. THE COST ESTIMATES WERE AS FOLLOWS:

CAPPING CONTAMINATED SOILS WITH CLEAN SOILS: \$62,500
EXCAVATION OF SOILS: \$50,000
TRANSPORT AND DISPOSAL OF SOILS IN A RCRA LANDFILL: \$13,200
TRANSPORT AND INCINERATION OF SOILS: \$229,700

THE RISK CALCULATED FOR THE INGESTION OF GROUNDWATER UNDER THE FUTURE-USE SCENARIO WAS DERIVED PRIMARILY FROM ONE GROUNDWATER SAMPLE WHICH INDICATED THE PRESENCE OF METHYLENE CHLORIDE. METHYLENE CHLORIDE IS A COMMON

LABORATORY CONTAMINANT. IT'S PRESENCE WAS NOT CONFIRMED IN THE SECOND ROUND OF GROUNDWATER SAMPLING. THE AGENCY BELIEVES THAT THE PRESENCE OF METHYLENE CHLORIDE IN THE ONE SAMPLE WAS AN ANOMALY. BECAUSE THE GROUNDWATER IS NOT CURRENTLY BEING USED AS DRINKING WATER DOWN-GRADIENT FROM THE QUARRY, NO REMEDIAL TECHNOLOGIES TO ADDRESS GROUNDWATER CONTAMINATION WERE CONSIDERED. MONITORING IS STRONGLY RECOMMENDED, HOWEVER, TO DETERMINE IF FUTURE REMEDIAL ACTIONS WILL BE WARRANTED.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

ALTERNATIVES ASSEMBLED TO ADDRESS THE QUARRY SEDIMENTS AND SURFACE SOILS WERE EVALUATED BASED ON THE FOLLOWING NINE CRITERIA:

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT;
COMPLIANCE WITH ALL FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS);
REDUCTION OF TOXICITY, MOBILITY OR VOLUME;
SHORT TERM EFFECTIVENESS;
LONG TERM EFFECTIVENESS;
IMPLEMENTABILITY;
COST;
COMMUNITY ACCEPTANCE; AND
STATE ACCEPTANCE.

A SUMMARY OF THE RELATIVE PERFORMANCE OF THE ALTERNATIVES WITH RESPECT TO EACH OF THE ABOVE NINE CRITERIA IS PROVIDED IN THIS SECTION.

ALL PROPOSED RESPONSE ACTIONS WOULD BE PROTECTIVE OF PUBLIC HEALTH. THE NO ACTION ALTERNATIVE WOULD, HOWEVER, LEAVE THE SITE WITH ACCEPTABLE (10(-4) TO 10(-7)) RISKS. ACCESS RESTRICTIONS, FENCING THE SITE AND POSTING "NO TRESPASSING" SIGNS, HAVE NOT PROVEN TOTALLY EFFECTIVE AS TRESPASSERS HAVE BEEN OBSERVED ON SITE.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS CONSIDERED INCLUDED AMBIENT WATER QUALITY CRITERIA (AWQC) FOR AQUATIC ORGANISMS AND FOR CONSUMPTION OF FISH, RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REQUIREMENTS FOR OFF-SITE DISPOSAL OF CONTAMINATED SOILS AND WATER QUALITY STANDARDS/ARARS FOR GROUND WATER. ONE BLACK RIVER SURFACE WATER SAMPLE COLLECTED IN THE MIXING ZONE BENEATH THE QUARRY OUTLET EXCEEDED THE AWQC ACUTE CRITERIA FOR ZINC. BECAUSE DOWNSTREAM ZINC CONCENTRATIONS WERE VIRTUALLY IDENTICAL TO UPSTREAM ZINC CONCENTRATIONS, IT IS FELT THAT ANY POTENTIAL ADVERSE IMPACT ON THE BLACK RIVER IS LIMITED. THE MAXIMUM NICKEL CONCENTRATION DETECTED IS VERY CLOSE TO THE WQC CONCENTRATION OF 100 UG/L FOR CONSUMPTION OF FISH. CONCENTRATIONS OF MANGANESE AND MERCURY IN THE QUARRY SURFACE WATER EXCEEDED FEDERAL AMBIENT WATER QUALITY CRITERIA FOR CONSUMPTION OF FISH (SEE TABLE 8). THE MERCURY CONCENTRATION WAS CALCULATED USING A CONSERVATIVE WATER/SEDIMENT PARTIONING MODEL. A FISH TISSUE BIOASSAY IS NEEDED TO DETERMINE CONTAMINANT LEVELS WHICH ARE PRESENT IN QUARRY FISH. POTENTIAL ARARS WHICH HAVE BEEN IDENTIFIED FOR GROUNDWATER ARE PRESENT IN TABLE 10. CONCENTRATIONS OF CHEMICALS OF POTENTIAL CONCERN AT THE SITE ARE GENERALLY BELOW THE WATER QUALITY CRITERIA. NO PRIVATE DRINKING WATER WELLS ARE IDENTIFIED DOWNGRADIENT OF THE SITE. FUTURE-USE CONSIDERATIONS WILL WARRANT CONTINUED MONITORING.

THE LAND DISPOSAL RESTRICTIONS UNDER 40 CFR PART 268 WERE DETERMINED TO BE AN APPLICABLE REQUIREMENT TO THE SELECTED REMEDY BECAUSE THE PRIMARY SOURCE OF CONTAMINATION OF THE DITCH SEDIMENTS WAS FROM WASTE PICKLE LIQUOR. WASTE PICKLE LIQUOR IS IDENTIFIED AS RCRA WASTE K062. UNDER THE FIRST THIRD RULE PROMULGATED ON AUGUST 8, 1988, PICKLE LIQUOR WASTE MUST MEET SPECIFIC BEST DEMONSTRATED AVAILABLE TECHNOLOGY (BDAT) TREATMENT LEVELS FOR CHROMIUM AND LEAD PRIOR TO LAND DISPOSAL. THE BDAT LEVELS PROMULGATED IN THE FIRST THIRD RULE (NON WASTE WATERS) ARE 0.094 MG/L & 0.37 MG/L (TCLP EXTRACT) FOR CHROMIUM AND LEAD RESPECTIVELY. DUE TO THE LOW LEVELS OF CHROMIUM AND LEAD CONTAMINATION IN THE SOILS AT THE REPUBLIC STEEL QUARRY SITE, IT IS BELIEVED THAT TREATMENT WILL NOT BE REQUIRED TO MEET THESE BDAT LEVELS. HOWEVER, PRIOR TO OFFSITE DISPOSAL, TCLP TESTS WILL BE PERFORMED ON THE SOILS TO DETERMINE THEIR COMPLIANCE. IN THE EVENT THAT TESTING REVEALS THAT THE SOILS DO NOT MEET THE TCLP BDAT LEVELS FOR CHROMIUM OR LEAD, EPA WILL SELECT AN APPROPRIATE TREATMENT TECHNOLOGY TO ENSURE COMPLIANCE WITH THE LAND DISPOSAL RESTRICTIONS.

THE CRITERIA DEALING WITH THE REDUCTION OF TOXICITY, MOBILITY OR VOLUME FOR CONTAMINANTS ONLY CONSIDERS REDUCTIONS DUE TO TREATMENT. OFF-SITE INCINERATION OF THE 100 CUBIC YARDS OF SURFACE SOILS WAS CONSIDERED AS

AN ALTERNATIVE.

A TREATMENT TECHNOLOGY TO ADDRESS THE QUARRY SEDIMENTS WAS NOT CONSIDERED BECAUSE DISTURBING THE SEDIMENTS AND MIXING THEM INTO QUARRY WATERS THROUGH EXCAVATION WOULD CREATE A GREATER POTENTIAL THREAT TO HUMAN HEALTH THAN THE SEDIMENTS CURRENTLY POSE.

ALL ALTERNATIVES CONSIDERED TO ADDRESS THE ON-SITE SURFACE SOIL CONTAMINATION, WITH THE EXCEPTION OF ALTERNATIVE 1 (NO ACTION) ARE EFFECTIVE IN THE SHORT TERM.

THE ACCESS RESTRICTIONS DO NOT PROVIDE AS HIGH A DEGREE OF EFFECTIVENESS BECAUSE TRESPASSERS HAVE BEEN OBSERVED ON-SITE. AS STATED ABOVE DISTURBANCE OF THE QUARRY SEDIMENTS WOULD LIKELY RESULT IN SHORT-TERM ADVERSE EFFECTS TO THE ENVIRONMENT AS WELL.

SOIL CONTAMINATION ALTERNATIVES 3 AND 4 (CONTAINMENT OR REMOVAL) PROVIDE THE HIGHEST DEGREE OF LONG TERM EFFECTIVENESS. NEITHER ALTERNATIVES 1 (NO ACTION) OR 2 (ACCESS RESTRICTIONS) PROVIDE LONG TERM HEALTH PROTECTION BECAUSE OF CONTINUED TRESPASSING ON SITE. THE CONTAINMENT (CAPPING ALTERNATIVE) WOULD REQUIRE OPERATION AND MAINTENANCE TO PROVIDE CONTINUED LONG TERM EFFECTIVENESS.

THE IMPLEMENTABILITY OF EACH ALTERNATIVE IS BASED ON THE TECHNICAL FEASIBILITY, ADMINISTRATIVE FEASIBILITY AND THE AVAILABILITY OF SERVICES AND MATERIALS FOR THE ALTERNATIVE. ALL OF THE ALTERNATIVES ARE TECHNICALLY FEASIBLE. THEY ALL INVOLVE TECHNOLOGIES WHICH HAVE BEEN USED REGULARLY IN THE PAST AND HAVE A DEMONSTRATED PERFORMANCE RECORD. THE SERVICES AND MATERIALS REQUIRED FOR EACH ALTERNATIVE ARE READILY AVAILABLE.

THERE ARE NO COSTS ASSOCIATED WITH THE NO ACTION ALTERNATIVES. THE ACCESS RESTRICTION ALTERNATIVE WOULD PRESENT MINIMAL COSTS AS THE SITE IS ALREADY FENCED. THE CAPPING OPTION HAS A PRESENT WORTH COST OF \$62,500, WHICH INCLUDES OPERATION AND MAINTENANCE. EXCAVATION OF THE SOILS AND DISPOSAL IN A RCRA LANDFILL HAS A TOTAL PRESENT WORTH COST OF \$63,200. EXCAVATING THE SOILS AND OFF SITE INCINERATION HAS A TOTAL PRESENT WORTH COST OF \$279,700. THE INCINERATION OPTION IS NOT FELT TO OFFER SIGNIFICANT INCREASES IN PROTECTIVENESS TO PUBLIC HEALTH AND THE ENVIRONMENT, SHORT TERM EFFECTIVENESS OR LONG TERM EFFECTIVENESS, OVER REMOVAL AND DISPOSAL, FOR THE ADDITIONAL COST.

LIMITED COMMENTS HAVE BEEN RECEIVED TO DATE FROM THE COMMUNITY REGARDING THE VARIOUS ALTERNATIVES CONSIDERED. IN A MEETING WITH ELYRIA CITY OFFICIALS (THE CITY IS A PRP) THE MAYOR AND COUNCIL INDICATED THAT OFF-SITE DISPOSAL WOULD BE THE FAVORED ALTERNATIVE. THE PUBLIC MEETING FOR THE PROPOSED PLAN WAS POORLY ATTENDED.

THE STATE OF OHIO, THROUGH THE OHIO EPA, HAS BEEN ACTIVELY INVOLVED IN THE RI PROCESS FOR THE REPUBLIC STEEL QUARRY SITE AND CONCURS WITH THE U.S. EPA'S SELECTED ACTION.

#SA

SELECTED ACTION

BASED ON AVAILABLE DATA AND ANALYSIS CONDUCTED TO DATE, THE U.S. EPA SELECTS THE REMOVAL AND OFF-SITE DISPOSAL OF THE SURFACE SOILS AS THE MOST APPROPRIATE SOLUTION FOR MEETING THE GOALS OF REMEDIATION OF THE REPUBLIC STEEL QUARRY SITE. THE CHARACTERISTICS OF THE SELECTED ALTERNATIVE THAT ARE CONSIDERED MOST IMPORTANT ARE:

- ! REMOVING APPROXIMATELY 100 CUBIC YARDS OF CONTAMINATED SOIL THAT ARE LOCATED IN (1) THE DITCH PREVIOUSLY USED TO DISCHARGE PICKLE LIQUOR TO THE QUARRY AND (2) ALONG THE SOUTHERN END OF THE QUARRY;
- ! DISPOSING EXCAVATED SOIL ACCORDING TO RCRA REGULATIONS.

A REMEDIAL TECHNOLOGY ALTERNATIVE IS NOT RECOMMENDED BY THE EPA TO ADDRESS THE CONTAMINATED QUARRY SEDIMENTS. THIS WAS DETERMINED BECAUSE DISTURBING THE SEDIMENTS AND MIXING THEM INTO QUARRY WATERS THROUGH EXCAVATION WOULD CREATE A GREATER POTENTIAL THREAT TO HUMAN HEALTH THAN THE SEDIMENTS PRESENTLY POSE. THE QUARRY IS CURRENTLY FENCED AND NO TRESPASSING SIGNS ARE POSTED, BUT THESE ACCESS RESTRICTIONS HAVE NOT BEEN TOTALLY EFFECTIVE. ACCESS TO THE SEDIMENTS IS ALSO RESTRICTED AS THEY ARE COVERED BY OVER 35 FEET OF WATER.

ALSO, SINCE LOW LEVELS OF CONTAMINATION HAVE BEEN DETECTED IN OTHER ON-SITE MEDIA, THIS SITE SHALL BE SUBJECT TO MONITORING UNDER THE FIVE YEAR REVIEW PROCESS, IN ACCORDANCE WITH SECTION 121(C) OF CERCLA. (SUPERFUND). THE PURPOSE OF THIS MONITORING, WHICH WILL BE CONDUCTED BY U.S. EPA, IS TO ASSURE THROUGH SAMPLING THAT INGESTION OF FISH AND INGESTION OF GROUNDWATER POSE NO UNACCEPTABLE HEALTH RISK. SPECIFIC TASKS RECOMMENDED AS PART OF THIS MONITORING PROCESS ARE:

- ! CONDUCTING A FISH SPECIES SURVEY AND FISH TISSUE BIOASSAY TO ASSURE THE ABSENCE OF CONTAMINANTS. THE SURVEY WILL INCLUDE IDENTIFYING SPECIES IN THE QUARRY AND SAMPLING EACH FISH SPECIES.
- ! RESAMPLING GROUNDWATER TO ASSURE THE CONCENTRATIONS OF ANY CONTAMINANTS ARE AT ACCEPTABLE RISK LEVELS.

DATA FROM FISH TISSUE BIOASSAYS SHALL BE PRESENTED TO THE OHIO DEPARTMENT OF PUBLIC HEALTH TO DETERMINE IF A FISHING ADVISORY IS WARRANTED FOR THE REPUBLIC STEEL QUARRY. THESE SAMPLING ACTIVITIES SHALL BE CONDUCTED BY U.S. EPA IN THE FALL OF 1988.

#SD

STATUTORY DETERMINATIONS

THE U.S. EPA AND OEPA BELIEVE THAT THIS REMEDY WILL SATISFY THE STATUTORY REQUIREMENTS OF PROVIDING PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINING APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF OTHER ENVIRONMENTAL STATUTES AND WILL BE COST-EFFECTIVE. THE SMALL VOLUME AND LIMITED LEVELS OF CONTAMINATION PRESENT IN THE SOIL AT THE SITE DO NOT WARRANT THE USE OF RESOURCE RECOVERY TECHNOLOGIES OR ALTERNATIVE TREATMENT TECHNOLOGIES.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED ACTION PROVIDES ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT BY PREVENTING EXPOSURE AND ACCIDENTAL INGESTION OF CONTAMINATED SURFACE SOILS. ADDITIONALLY, FURTHER U.S. EPA CONDUCTED MONITORING WILL ASSURE THAT FISH IN THE QUARRY AND THE DOWNGRADE GROUNDWATER DO NOT POSE A HUMAN HEALTH THREAT.

ATTAINMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ALTHOUGH NO ARARS ARE AVAILABLE FOR SURFACE SOILS AND QUARRY SEDIMENTS, BECAUSE THE SURFACE SOILS POSE A SLIGHT FUTURE-USE, HEALTH-BASED RISK, THEIR REMOVAL AND DISPOSAL IS WARRANTED IN THIS CASE. DISPOSAL OF THE SOILS WILL FOLLOW RESOURCE CONSERVATION AND RECOVERY ACT (40 CFR SECTION 268.41) PROCEDURES. AMBIENT WATER QUALITY CRITERIA (AWQC) FOR AQUATIC ORGANISMS HAVE BEEN EXCEEDED BY THE SITE IN ITS PRESENT CONDITION. THE NEED FOR FISH SPECIES SURVEY AND TISSUE BIOASSAY IS INDICATED. GROUND WATER IS NOT CURRENTLY USED AS DRINKING WATER DOWNGRADE OF THE SITE.

COST-EFFECTIVENESS

THIS ALTERNATIVE AFFORDS A HIGH DEGREE OF OVERALL EFFECTIVENESS BY ELIMINATING THE MOST ACCESSIBLE PATHWAY OF EXPOSURE. THE PRESENT WORTH COST OF THIS ACTION IS \$63,200. THIS COMPARES WITH THE \$279,700 REQUIRED FOR OFF-SITE INCINERATION OF THE SOILS. U.S. EPA BELIEVES THE COSTS OF THE SELECTED REMEDY ARE PROPORTIONATE TO THE OVERALL EFFECTIVENESS IT AFFORDS.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

U.S. EPA BELIEVES THIS REMEDY IS THE MOST APPROPRIATE SOLUTION FOR MEETING THE GOALS OF REMEDIATION AT THE REPUBLIC STEEL QUARRY SITE PROVIDING THE BEST BALANCE AMONG THE EVALUATION CRITERIA FOR THE ALTERNATIVES EVALUATED. THIS REMEDY PROVIDES EFFECTIVE PROTECTION IN BOTH THE SHORT AND LONG-TERM TO POTENTIAL HUMAN AND ENVIRONMENTAL RECEPTORS, PROTECTS FUTURE RESIDENTS FROM EXPOSURE TO CONTAMINATED SOILS IS READILY IMPLEMENTED, AND IS COST EFFECTIVE.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

DUE TO THE LIMITED SCOPE OF THIS REMEDY, THE STATUTORY PREFERENCE FOR TREATMENT WILL NOT BE MET. THE SMALL VOLUME AND LEVELS OF CONTAMINATION PRESENT IN THE SOILS DO NOT MAKE TREATMENT A COST-EFFECTIVE ALTERNATIVE.

SCHEDULE

THE FOLLOWING ARE THE KEY MILE STONES FOR IMPLEMENTATION OF THE REMEDIAL ACTION IN THE EVENT THAT RD/RA NEGOTIATIONS ARE NOT SUCCESSFUL.

APPROVE REMEDIAL ACTION (EXECUTE ROD)	SEPTEMBER 1988
FISH SURVEY AND TISSUE BIOASSAY	FALL 1988
INITIAL REMEDIAL DESIGN (FOR LIMITED SOIL REMOVAL)	JANUARY 1989
COMPLETE REMEDIAL DESIGN	MARCH 1989
INITIATE REMEDIAL ACTION (AWARD CONTRACT FOR LIMITED SOIL REMOVAL)	JUNE 1989

#RS

REPUBLIC STEEL QUARRY SITE
ELYRIA, OHIO

RESPONSIVENESS SUMMARY

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA) RECENTLY HELD A PUBLIC COMMENT PERIOD, SEPTEMBER 2 - SEPTEMBER 23, 1988, FOR INTERESTED PARTIES TO COMMENT ON THE U.S. EPA'S AUGUST 26, 1988 REMEDIAL INVESTIGATION (RI) REPORT AND PROPOSED PLAN FOR THE REMEDIAL ACTION FOR THE REPUBLIC STEEL QUARRY SITE. AT THE BEGINNING OF THE PUBLIC COMMENT PERIOD, THE U.S. EPA ANNOUNCED ITS RECOMMENDED ALTERNATIVE FOR THE REPUBLIC STEEL QUARRY SITE.

THE PURPOSE OF THIS RESPONSIVENESS SUMMARY IS TO DOCUMENT U.S. EPA'S RESPONSES TO COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD. ALL OF THE COMMENTS SUMMARIZED IN THIS DOCUMENT WERE CONSIDERED BY U.S. EPA IN ITS FINAL DECISION.

THIS RESPONSIVENESS SUMMARY IS DIVIDED INTO THE FOLLOWING SECTIONS:

I. RESPONSIVENESS SUMMARY OVERVIEW- THIS SECTION BRIEFLY OUTLINES THE PROPOSED REMEDIAL ALTERNATIVE EVALUATED IN THE PROPOSED PLAN, INCLUDING THE RECOMMENDED ALTERNATIVE.

II. SUMMARY OF COMMENTS ON THE RI REPORT AND PROPOSED PLAN- THIS SECTION SUMMARIZES BOTH WRITTEN AND ORAL COMMENTS RECEIVED FROM INTERESTED PARTIES.

I. RESPONSIVENESS SUMMARY OVERVIEW

A. RECOMMENDED ALTERNATIVE

THE FINDINGS OF THE RI REPORT SHOWED THAT THE SITE POSED LIMITED HEALTH RISKS. AFTER CAREFUL CONSIDERATION OF THE FINDINGS THE AGENCY CONDUCTED AN ASSESSMENT OF ALTERNATIVES, TECHNOLOGIES AND REMEDIES AND PRESENTED THIS ASSESSMENT IN THE PROPOSED PLAN. THE ALTERNATIVES WERE EVALUATED BASED ON THE NINE CRITERIA DETAILED IN THE PROPOSED PLAN.

THE MAJOR COMPONENTS OF U.S. EPA'S SELECTED REMEDY FOR THE REPUBLIC STEEL QUARRY ARE AS FOLLOWS:

! REMOVING APPROXIMATELY 100 CUBIC YARDS OF CONTAMINATED SOIL THAT ARE LOCATED (1) IN THE DITCH PREVIOUSLY USED TO DISCHARGE PICKLE LIQUOR TO THE QUARRY AND (2) ALONG THE SOUTHERN END OF THE QUARRY;

! DISPOSING EXCAVATED SOIL ACCORDING TO RCRA REGULATIONS.

ALSO, SINCE LOW LEVELS OF CONTAMINATION HAVE BEEN DETECTED IN OTHER ON-SITE MEDIA, THIS SITE SHALL BE SUBJECT TO MONITORING UNDER THE FIVE YEAR REVIEW PROCESS, IN ACCORDANCE WITH SECTION 121(C) OF CERCLA (SUPERFUND). SPECIFIC TASKS RECOMMENDED AS PART OF THIS MONITORING INCLUDE:

! CONDUCTING A FISH SPECIES SURVEY AND FISH TISSUE BIOASSAY TO ASSURE THE ABSENCE OF CONTAMINANTS. THE SURVEY WILL INCLUDE IDENTIFYING SPECIES IN THE QUARRY AND SAMPLING EACH FISH SPECIES.

! RESAMPLING GROUNDWATER TO ASSURE THE CONCENTRATIONS OF ANY CONTAMINANTS ARE AT ACCEPTABLE RISK LEVELS.

B. PUBLIC COMMENTS ON THE PROPOSED PLAN

FORMAL WRITTEN COMMENTS ON THE REPUBLIC STEEL QUARRY PROPOSED PLAN WERE SUBMITTED BY TWO GROUPS; LTV STEEL CORPORATION AND THE CITY OF ELYRIA. NO ORAL COMMENTS WERE RECEIVED DURING THE PUBLIC MEETING WHICH WAS HELD ON SEPTEMBER 15, 1988 IN ELYRIA, OHIO.

II. SUMMARY OF COMMENTS ON THE PROPOSED PLAN

THE FOLLOWING SECTION SUMMARIZED WRITTEN AND ORAL COMMENTS RECEIVED FROM INTERESTED PARTIES. MANY OF THE COMMENTS WERE EDITED FOR CLARITY OR WHEN MULTIPLE PARTIES MAKE A SIMILAR COMMENT.

COMMENT:

ERA ERRONEOUSLY CHARACTERIZES THAT DISCHARGES OF RINSE WATER TO THE BLACK RIVER HAVE CONTINUED SINCE 1976. THE LTV STEEL CORP. PLANT DISCONTINUED PICKLING OPERATIONS IN 1976 AND HAS NEVER DISCHARGED RINSE WATER DIRECTLY INTO THE BLACK RIVER.

U.S. EPA'S RESPONSE:

AFTER INVESTIGATING THIS CLAIM, THE U.S. EPA AGREES THAT THE LTV STEEL PLANT HAS NOT CONTINUED TO DISCHARGE RINSE WATER FROM PICKLING OPERATIONS TO THE BLACK RIVER. THE DITCH NOW FUNCTIONS AS A DRAIN FOR FAST WATER FROM PLANT ROADS AND PARKING LOTS. DRAIN WATERS ARE MONITORED IN ACCORDANCE WITH EPA REGULATIONS. AN ERRATA TO THE RI REPORT, WHICH INCLUDES THIS ERROR, WILL BE MAILED TO THE REPUBLIC STEEL QUARRY INFORMATION REPOSITORY.

COMMENT:

AS LONG AS THE SITE MAINTAINS A RESTRICTED ENTRY STATUS, ADDITIONAL TESTING ON THE FISH POPULATION IS NOT NECESSARY.

U.S. EPA'S RESPONSE:

THE U.S. EPA MAINTAINS THAT FISH TISSUE STUDIES AT THE SITE ARE NECESSARY. RESULTS FROM THE REPUBLIC STEEL RI REPORT INDICATE THAT FISH IN THE QUARRY MAY POSE A RISK TO PUBLIC HEALTH. THIS DETERMINATION IS BASED ON CONSERVATIVE MODELING OF UPTAKE OF SEDIMENT CONTAMINATION BY FISH AS OPPOSED TO ACTUAL FISH TISSUE DATA. FISH TISSUE ANALYSES WERE NOT PERFORMED AS A TASK UNDER THE RI BECAUSE IT WAS FELT THAT MODELING WOULD BE SUFFICIENT TO EVALUATE WHETHER THE FISH POSED A HEALTH RISK. THE RI, HOWEVER, INDICATED MORE RISK THAN WAS EXPECTED AND INDICATED THAT FISH TISSUE BIOASSAYS ARE WARRANTED.

ACCESS RESTRICTIONS, SUCH AS THE EXISTING SITE FENCE, WERE CONSIDERED AND PUT OUT FOR PUBLIC COMMENT (SEE THE REPUBLIC STEEL QUARRY SITE PROPOSED PLAN). THE EXISTING SITE ACCESS RESTRICTIONS HAVE NOT PROVEN TOTALLY EFFECTIVE, AS INDICATED BY NUMEROUS REPORTS OF TRESPASSERS FISHING AND SWIMMING AT THE SITE. CITY OFFICIALS HAVE INDICATED THAT THE CITY CAN NOT AFFORD TO MONITOR THE SITE ON A FULL TIME BASIS. FOR THESE REASONS, ACCESS RESTRICTIONS WERE NOT IDENTIFIED AS BEING AS PROTECTIVE OF HUMAN HEALTH AND AS PERMANENT OF A SOLUTION AS OTHER IDENTIFIED ALTERNATIVES.

FINALLY, THE U.S. EPA IS REQUIRED BY LAW (CERCLA SECTION 121(C)) TO PERFORM A FIVE-YEAR REVIEW ON SITES AT WHICH HAZARDOUS SUBSTANCES ARE LEFT ON SITE. THE REPUBLIC STEEL QUARRY SITE FALLS INTO THIS CATEGORY.

COMMENT:

IF U.S. EPA PERFORMS ADDITIONAL GROUNDWATER MONITORING FOR ORGANIC CONSTITUENTS, PROPER LABORATORY QA/QC PROCEDURES SHOULD BE FOLLOWED.

U.S. EPA'S RESPONSE:

THE U.S. EPA STRIVES TO MAINTAIN HIGH QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES THROUGHOUT ALL INVESTIGATIONS. LABORATORIES WHICH THE U.S. EPA USES TO PERFORM ANALYSES UNDERGO A VERY STRINGENT VALIDATION PROCESS TO ASSURE QUALITY DATA IS GENERATED. THE U.S. EPA WILL FOLLOW PROPER LABORATORY QA/QC PROCEDURES DURING ANY SAMPLING TO BE CONDUCTED AT THE REPUBLIC STEEL QUARRY SITE.

COMMENT:

THE ADDITIONAL GROUNDWATER SAMPLING IS NOT NECESSARY.

U.S. EPA'S COMMENTS:

THE AGENCY BELIEVES THAT THE ADDITIONAL GROUNDWATER SAMPLING IS VERY NECESSARY TO ASSURE THE ABSENCE OF METHYLENE CHLORIDE IN THE DOWNGRAIDENT GROUNDWATER. THE CONCENTRATION OF METHYLENE CHLORIDE DETECTED IN THE FIRST GROUNDWATER SAMPLING ROUND IS DRIVING THE ENTIRE CANCER RISK FOR INGESTION OF GROUNDWATER UNDER THE FUTURE-USE SCENARIO. IF THE DETECTION OF METHYLENE CHLORIDE PROVES TO BE A LABORATORY ARTIFACT, CANCER RISK POSED BY THE GROUNDWATER WILL BE DECREASED TO ACCEPTABLE RISK LEVELS.

COMMENT:

IT WAS RECOMMENDED THAT THE SMALL AMOUNT OF SOIL SUGGESTED TO BE EXCAVATED BE ALLOWED TO REMAIN AS LONG AS ENTRY ON THE SITE REMAINS RESTRICTED.

U.S. EPA'S RESPONSE:

AS HAS BEEN STATED PREVIOUSLY, ACCESS RESTRICTIONS PRESENTLY IN PLACE AT THE SITE HAVE NOT BEEN TOTALLY EFFECTIVE. THE ACCESS RESTRICTION ALTERNATIVE WAS PRESENTED IN THE PROPOSED PLAN FOR THE REPUBLIC STEEL QUARRY SITE. THE SOIL REMOVAL AND OFF-SITE DISPOSAL ALTERNATIVE WAS SELECTED OVER THE ACCESS RESTRICTION ALTERNATIVE BECAUSE IT IS MORE PROTECTIVE OF PUBLIC HEALTH AND IS A MORE PERMANENT, LONG-TERM SOLUTION WHICH CAN BE IMPLEMENTED FOR A REASONABLE COST. REMOVAL OF THE CONTAMINATED SOILS WILL ELIMINATE ONE EXPOSURE PATHWAY AT THE SITE WHICH WOULD HAVE REQUIRED FUTURE MONITORING.

COMMENT:

THE U.S. EPA SHOULD PROVIDE THE CITY OF ELYRIA WITH THE OPTION OF USING ITS OWN PERSONNEL AND EQUIPMENT TO EFFECT THE SOIL REMOVAL.

U.S. EPA'S RESPONSE:

THE U.S. EPA WILL OFFER THE OPPORTUNITY FOR POTENTIALLY RESPONSIBLE PARTIES (PRP'S) TO CONDUCT THE SOIL REMOVAL AT THE REPUBLIC STEEL QUARRY SITE. THE REMOVAL WILL BE CONDUCTED ACCORDING TO U.S. EPA REGULATIONS AND GUIDELINES WITH U.S. EPA OVERSIGHT.

COMMENT:

U.S. EPA'S INVESTIGATION OF THE QUARRY IS AN OVERREACTION TO A SITE THAT DOES NOT BELONG ON THE NATIONAL PRIORITIES LIST.

U.S. EPA'S RESPONSE:

A SUBSTANTIAL AMOUNT OF HAZARDOUS WASTE WAS DISPOSED OF IN THE REPUBLIC STEEL QUARRY SITE. THE HEALTH RISKS POSED BY THE SITE WERE EVALUATED USING STANDARD FIELD PROCEDURES, STRICT INTERPRETATIONS OF THE HAZARDOUS RANKING SYSTEM (HRS) SCORING REGULATIONS AND QUALITY ASSURED/QUALITY CONTROLLED DATA. ONCE A SITE HAS BEEN PLACED ON THE NATIONAL PRIORITIES LIST (NPL), THE U.S. EPA IS REQUIRED BY LAW TO FULLY INVESTIGATE POTENTIAL HEALTH RISKS POSED BY EVERY ASPECT OF THE SITE. THE REPUBLIC STEEL QUARRY REMEDIAL INVESTIGATION REPORT DOCUMENTS THAT CONTAMINATION RELATED TO DISPOSAL PRACTICES AT THE SITE IS PRESENT IN QUARRY SEDIMENTS, GROUNDWATER AND SURFACE SOILS. THE REPORT ALSO DOCUMENTS THAT THE SITE CONTAMINATION POSES ONLY A LIMITED HEALTH RISK. THE LIMITED HEALTH RISKS IN NO WAY SUPPORT THE CLAIM THAT THE SITE SHOULD NOT HAVE BEEN PLACED ON THE NPL IN THE FIRST PLACE.

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TABLE 1

CONCENTRATIONS OF CHEMICALS OF CONCERN IN QUARRY
SURFACE WATER AT THE REPUBLIC STEEL SITE
REPUBLIC STEEL QUARRY RI

CHEMICAL	MEAN CONCENTRATION (UG/L)	MAXIMUM CONCENTRATION (UG/L)	FREQUENCY OF DETECTION
BARIUM	46	113	19/19
CALCIUM	56,700	315,000	19/19
IRON	3,070	1,600,000	19/19
MAGNESIUM	23,600	88,900	19/19
MANGANESE	940	25,700	11/19
NICKEL	NA	86	5/19
VANADIUM	4.4	60	8/19
ZINC		37	12/19

NA - THE MEAN CONCENTRATION IS BELOW THE DETECTION LEVEL AND IS CONSIDERED AS A NONDETECT.

TABLE 2
 CONCENTRATIONS OF CHEMICALS OF CONCERN IN SEDIMENT
 AT THE REPUBLIC STEEL SITE REPUBLIC STEEL QUARRY RI

CHEMICAL	MEAN CONCENTRATION (UG/KG)	MAXIMUM CONCENTRATION (UG/KG)	FREQUENCY OF DETECTION
BUTYLBENZYLPHthalATE	2,600	73,000	2/7
DI-N-OCTYLPHthalATE	2,500	6,250	3/7
DIETHYLPHthalATE	3,730	56,000	4/7
TOLUENE	30	370	2/7
METHYLENE CHLORIDE	NA	25	2/7
ACETONE	93	1,135	4/7
TETRACHLOROETHANE	5	38	2/7
ETHYLBENZENE	3.5	28	1/7
2-BUTANONE	37	360	4/7
NCPNA	8,430	33,200	6/7
CPNA	3,000	16,900	4/7
PENTACHLOROPHENOL	8,830	25,000	2/7
COPPER	58,000	300,000	6/7
MERCURY	400	730	2/7
TIN	10,000	108,000	3/7
DIETHYLPHthalATE	4,200	54,000	3/7
DI-N-BUTYLPHthalATE	2,160	31,000	3/7
BIS (2-ETHYLHEXYL) PHthalATE	4,000	68,000	2/7

NA = THE MEAN CONCENTRATION IS BELOW THE DETECTION LEVEL AND IS CONSIDERED AS A NONDETECT.

TABLE 3
 CONCENTRATIONS OF CHEMICALS OF CONCERN IN SOIL
 AT THE REPUBLIC STEEL SITE REPUBLIC STEEL QUARRY RI

CHEMICAL	MEAN CONCENTRATION (UG/KG)	MAXIMUM CONCENTRATION (UG/KG)	FREQUENCY OF DETECTION
METHYLENE CHLORIDE	15	33	2/4
ACETONE	37	150	2/4
2-BUTANONE	NR	78	1/4
NCPNA	3,210	5,080	3/4
CPNA	NA	1,800	3/4
COPPER	85,000	94,000	3/4
MERCURY	NA	340	2/4
BIS(2-ETHYLHEXYL) PHTHALATE	NR	7,800	1/4
DI-N-BUTYLPHTHALATE	NA	2,400	2/4
DI-N-OCTYLPHTHALATE	NA	1,900	1/4
CHROMIUM	32,000	178,000	3/4
MANGANESE	842,000	5,990,000	4/4

NR = NOT RELEVANT. ONLY 1 SAMPLE CONTAINED DETECTABLE CONCENTRATIONS; THEREFORE A GEOMETRIC MEAN WAS NOT CALCULATED.

NA = THE MEAN VALUE WAS BELOW DETECTION.

TABLE4
 CONCENTRATIONS OF CHEMICALS OF CONCERN IN GROUNDWATER
 AT THE REPUBLIC STEEL SITE REPUBLIC STEEL QUARRY RI

CHEMICAL	MEAN CONCENTRATION (UG/L)	MAXIMUM CONCENTRATION (UG/L)	FREQUENCY OF DETECTION
LEAD	NR	19	1/5
NICKEL	NA	131	3/5
ZINC	43	106	5/5
PENTACHLOROPHENOL	NR	5(A)	1/5
PHENOL	NR	LO(B)	1/5
BARIUM	64	114	5/5
BERYLLIUM	1	2.1	3/5
CHROMIUM	8.4	20	3/5
COPPER	11	28	2/5
MANGANESE	1,490	11,600	5/5
NICKEL	117	131	4/5
SILVER	NR	4.1	1/5
VANADIUM	29	57	4/5
METHYLENE CHLORIDE	7	140	2/5
ACETONE	8	55	1/5

NA = THE MEAN CONCENTRATION IS BELOW THE DETECTION LIMIT.

NR = NOT RELEVANT. ONLY 1 SAMPLE CONTAINED DETECTED CONCENTRATIONS; THEREFORE, A GEOMETRIC MEAN WAS NOT CALCULATED.

(A) THE VALUE IS ESTIMATED IN THE DATA BASE AND IS ONE HALF THE DETECTION LIMIT.

(B) THE DETECTION LIMIT OF PHENOL IS 10 UG/L.

TABLE 5
 POTENTIAL PATHWAYS OF EXPOSURE TO CONTAMINANTS ORIGINATING
 AT THE REPUBLIC STEEL QUARRY UNDER CURRENT-USE CONDITIONS
 REPUBLIC STEEL QUARRY

MEDIUM	POTENTIAL ROUTES OF EXPOSURE	POTENTIAL RECEPTORS	PATHWAY COMPLETE?
SOIL (SURFACE)	DERMAL ABSORPTION, INCIDENTAL INGESTION	TRESPASSERS	YES. HOWEVER, THE MAJORITY OF THE SITE IS DENSELY VEGETATED.
AIR	INHALATION OF VOLATILE ORGANICS AND/OR FUGITIVE DUST	TRESPASSERS, NEARBY RESIDENTS	NO. DENSE VEGETATION COVER PROHIBITS SOILS FROM BECOMING AIRBORNE.
SURFACE WATER/ SEDIMENT	DERMAL ABSORPTION, INCIDENTAL INGESTION	TRESPASSERS SWIMMING IN QUARRY	YES. TRESPASSERS HAVE BEEN OBSERVED SWIMMING IN THE QUARRY. QUARRY DEPTH PRECLUDES EXPOSURE TO SEDIMENT.
		UPTAKE BY FISH SUBSEQUENT INGESTION BY HUMANS	YES. LARGE FISH WERE OBSERVED IN THE QUARRY.
		PEOPLE FISHING IN NEARBY SURFACE WATER BODIES	NO. NO SITE RELATED CONTAMINANTS HAVE BEEN DETECTED IN BLACK RIVER DOWN-GRADIENT OF THE QUARRY.
GROUNDWATER	INGESTION, INHALATION, DERMAL ABSORPTION	LOCAL RESIDENTS	NO. GROUNDWATER IS NOT CURRENTLY BEING USED FOR A POTABLE SUPPLY IN THE VICINITY OF THE SITE.

TABLE 6
 POTENTIAL PATHWAYS OF EXPOSURE TO CONTAMINANTS ORIGINATING AT THE
 REPUBLIC STEEL QUARRY UNDER FUTURE-USE CONDITIONS
 REPUBLIC STEEL QUARRY

MEDIUM	POTENTIAL ROUTES OF EXPOSURE	POTENTIAL RECEPTORS	PATHWAY COMPLETE?
SOIL (SURFACE)	DERMAL ABSORPTION	FUTURE USERS OF THE SITE (RESIDENTS)	YES.
GROUNDWATER	INGESTION, INHALATION, DERMAL ABSORPTION	FUTURE USERS OF THE SITE	YES.

TABLE 7
SUMMARY OF POTENTIAL RISKS ASSOCIATED WITH THE REPUBLIC STEEL QUARRY
REPUBLIC STEEL QUARRY RI

EXPOSURE SCENARIO	TOTAL CANCER RISKS		NONCARCINOGENIC HAZARD INDEX	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
CURRENT-USE (TRESPASSERS)				
DIRECT CONTACT WITH SOIL	2X10(-8)	4X10(-7)	1	1
SWIMMING IN THE QUARRY	1XLO(-LO)	4XLO(-LO)	1	1
CONSUMPTION OF FISH 1	9X10(-9)	4X10(-6)	1	
COMBINED RISK TO TRESPASSERS 1	3XLO(-8)	4X10(-6)	1	
FUTURE-USE				
PARK PATRON - DIRECT CONTACT WITH SOIL	4X10(-8)	LX10(-6)	1	1
RESIDENTIAL USE - DIRECT CONTACT WITH SOIL	3X10(-7)	2X10(-5)	1	1
INGESTION OF GROUND WATER 1	2X10(-6)	3X10(-5)	1	
COMBINED RESIDENTIAL RISK 1	2X10(-6)	5X10(-5)	1	

TABLE 8
COMPARISON OF QUARRY SURFACE WATER CONCENTRATIONS AT THE REPUBLIC STEEL WITH AWQC TOXICITY VALUES
REPUBLIC STEEL QUARRY RI

CHEMICAL	CONCENTRATION IN SURFACE WATER (UG/L)		FEDERAL WATER QUALITY CRITERIA (UG/L) FOR CONSUMPTION OF FISH
	AVERAGE	MAXIMUM	
NICKEL	NA	86	100
VANADIUM	4.4	60	--
BARIUM	46	113	--
MANGANESE	9,210	75,700	100 UG/L
NCPNA (A)	0.00014	0.00060	--
CPNA (A)	0.000050	0.00058	0.031
PENTACHLORO- PHENOL (A)	0.0028	0.0059	--
ACETONE (A)	3.4	42	--
TETRACHLORO- ETHANE (A)	0.0026	0.011	--
ETHYBENZENE (A)	0.00029	0.00024	3,280
2-BUTANONE (A)	1.0	8.0	--
BIS (2-ETHYLHEXYL) PHTHALATE (A)	.0042	0.061	--
COPPER (A)	18	96	--
MERCURY (A)	0.44	0.81	0.146
METHYLENE- CHLORIDE (A)	NR	0.28	--
BUTYLBENZYL- PHTHALATE (A)	0.014	0.405	--
DI-N-BUTYL- PHTHALATE (A)	0.0012	0.017	--
TOLUENE (A)	0.009	0.11	424,000

NR = NOT RELEVANT. CHEMICAL WAS DETECTED AT ONLY 1 LOCATION.

NA = NOT APPLICABLE. THE MEAN VALUE WAS BELOW DETECTION.

(A) = CALCULATED CONCENTRATION

TABLE 9
COMPARISON OF SURFACE WATER CONCENTRATIONS AT THE REPUBLIC STEEL SITE WITH AWOC TOXICITY VALUES
REPUBLIC STEEL QUARRY RI

CHEMICAL	CONCENTRATIONS IN WATER (UG/L)		STATE WATER QUALITY CRITERIA AQUATIC LIFE (UG/L)	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
TETRACHLOROETHENE	0.0013	0.011	--	--
ETHYLBENZENE	0.00029	0.0025	--	--
2-BUTANONE	1.0	8.0	--	--
NCPNA	0.00014	0.00060	--	--
CPNA	0.000050	0.00058	--	--
COPPER	18	96	14(B)	--
MERCURY	0.44	0.81	0.2	2.2
PENTACHLOROPHENOL	0.015	0.043	1	--
ACETONE	3.4	42	--	--
METHYLENE CHLORIDE	NC	0.28	--	--
BIS(2-ETHYLHEXYL) PHTHALATE	0.0042	0.061	--	--
DIETHYLPHTHALATE	40	87	--	--
MAGNESIUM	23,600	67,500	--	--
NICKEL	NA	86	341	--
VANADIUM	4.4	60	--	--
CALCIUM	56,700	315,000	--	--
METHYLENE CHLORIDE	NA	0.28	--	--
TIN	--	--	--	--
BARIUM	46	113	--	--
MANGANESE	940	25,700	--	--
BUTYLBENZYPHTHALATE	0.014	0.405	--	--
DI-N-BUTYLPHTHALATE	0.0012	0.017	--	--
DI-N-OCTYLPHALATE	0.0053	0.0047	--	--
TOLUENE	0.009	0.11	--	--

NC = NOT CALCULATED

NA = THE MEAN VALUE WAS BELOW DETECTION

(A) FOR NAPHTHALENE

(B) HARDNESS DEPENDENT PARAMETER

(C) AS PHTALATE ESTERS. INSUFFICIENT DATA TO DEVELOP CRITERIA. VALUE PRESENT AT THE LOWEST OBSERVED EFFECT LEVEL.

TABLE 9 (CONTINUED)

COMPARISON OF SURFACE WATER CONCENTRATIONS AT THE REPUBLIC STEEL SITE WITH AWOC TOXICITY VALUES
 REPUBLIC STEEL QUARRY RI

FEDERAL WATER
 QUALITY CRITERIA

CHEMICAL	CHRONIC	ACUTE
TETRACHLOROETHENE	--	--
ETHYLBENZENE	--	32,000 (LOEL)
2-BUTANONE	--	--
NCPNA	620 (A)	2,300 (A)
CPNA	--	--
COPPER	12	18
MERCURY	0.012	2.4
PENTACHLOROPHENOL	13	20
ACETONE	--	--
METHYLENE CHLORIDE	--	--
BIS (2-ETHYLHEXYL)		
PHTHALATE	3 (C)	940 (C)
DIETHYLPHTHALATE	3 (C)	940 (C)
MAGNESIUM	--	--
NICKEL	160	1,400
VANADIUM	--	--
CALCIUM	--	--
METHYLENE CHLORIDE	--	--
TIN	--	--
BARIUM	--	--
MANGANESE	--	--
BUTYLBENZYPHTHALATE	3 (C)	940 (C)
DI-N-BUTYLPHTHALATE	3 (C)	940 (C)
DI-N-OCTYLPHALATE	3 (C)	940 (C)
TOLUENE	--	17,500 (B)

NC = NOT CALCULATED

NA = THE MEAN VALUE WAS BELOW DETECTION

(A) FOR NAPHTHALENE

(B) HARDNESS DEPENDENT PARAMETER

(C) AS PHTALATE ESTERS. INSUFFICIENT DATA TO DEVELOP CRITERIA. VALUE PRESENT AT THE LOWEST OBSERVED EFFECT LEVEL.

TABLE 10
COMPARISON OF GROUNDWATER CONCENTRATION AT THE REPUBLIC STEEL SITE WITH ARARS
REPUBLIC STEEL QUARRY RI

CHEMICAL	CONCENTRATION IN GROUND WATER (UG/L)		OHIO	FEDERAL
	AVERAGE	MAXIMUM		
BARIUM	64	114	--	1,000 MCL(C)
BERYLLIUM	1	2.1	--	0(3.9 NG/L)(D)
MANGANESE	1,490	11,600	--	--
CHROMIUM	8.4	20	--	50 MCL(C)
COPPER	11	28	--	--
LEAD	NR	19	--	50 MCL(C)
NICKEL	117	131	--	15.4 WQC(A)
ZINC	51	106	--	5,000 WQC(B) (ORGANOLEPTIC)
PENTACHLOROPHENOL	NR	5	--	--
PHENOL	NR	10	--	3,500 WQC(A)
ALUMINUM	2,600	11,600	--	--
CALCIUM	190,000	348,000	--	--
COBALT	NR	18	--	--
SILVER	NR	4.1	--	50 WQC(A)
VANADIUM	29	57	--	--
METHYLENE CHLORIDE	7	140	--	--
ACETONE	8	55	--	--

NR = NOT RELEVANT. CHEMICAL WAS DETECTED AT ONLY 1 LOCATION.

(A) THESE ADJUSTED CRITERIA, FOR DRINKING WATER INVESTIGATION ONLY, WERE DERIVED FROM PUBLISHED EPA AMBIENT WATER QUALITY CRITERIA (45 FR 79318-79379, NOVEMBER 28, 1980) FOR COMBINED FISH AND DRINKING WATER INGESTION AND FOR FISH INGESTION ALONE. THE ADJUSTED VALUES ARE NOT OFFICIAL EPA AMBIENT WATER QUALITY CRITERIA, BUT MAYBE APPROPRIATE FOR SUPERFUND SITES WITH CONTAMINATED GROUNDWATER.

(B) CRITERIA DESIGNATED AS ORGANANOLEPTIC ARE BASED ON TASTE AND ODOR EFFECTS, NOT HUMAN HEALTH EFFECTS. HEALTH-BASE WATER QUALITY CRITERIA IS NOT AVAILABLE FOR THIS CHEMICAL.

(C) MCL = MAXIMUM CONTAMINANT LEVEL FOR DRINKING WATER STANDARDS.

(D) WATER QUALITY CRITERIA (WQC); CONCENTRATIONS IN PARENTHESES CORRESPOND TO MIDPOINT OF RISK RANGE FOR POTENTIAL CARCINOGENS.